

Claims

[c1] What is claimed is:

1. An air intake assembly for an internal combustion engine comprising:

a throttle body;

a first and a second inlet formed in the throttle body;

an outlet formed in the throttle body; and

a throttle plate rotatably positioned in the first inlet, the second inlet open to atmosphere.

[c2] 2. The air intake assembly of claim 1 wherein the second inlet and the outlet are on a common side of the throttle body.

[c3] 3. The air intake assembly of claim 1 wherein the second inlet is on a side of the throttle body generally opposite the throttle plate.

[c4] 4. The air intake assembly of claim 1 further comprising an idle air bypass tube in the second inlet.

[c5] 5. The air intake assembly of claim 4 further comprising a shoulder formed on an outer surface of the idle bypass tube configured to engage an outer surface of the throttle body.

- [c6] 6. The air intake assembly of claim 4 wherein the idle air bypass tube provides a direct passage from the throttle body to atmosphere.
- [c7] 7. The air intake assembly of claim 6 wherein the direct passage has a Venturi therein.
- [c8] 8. The air intake assembly of claim 4 wherein the idle air bypass tube has an outer surface having at least one rib formed thereon.
- [c9] 9. The air intake assembly of claim 4 wherein the idle air bypass tube has an opening having a constriction formed therein.
- [c10] 10. The air intake assembly of claim 1 further comprising a throttle shaft connected to the throttle plate and rotationally mounted to the throttle body.
- [c11] 11. The air intake assembly of claim 10 further comprising a mechanical actuator having a range of rotation and connected to the throttle shaft, the range of rotation of the mechanical actuator being greater than a range of rotation of the throttle shaft.
- [c12] 12. The air intake assembly of claim 10 further comprising a mechanical actuator connected to the throttle shaft and having an engagement therebetween, the engage-

ment configured to couple and decouple the mechanical actuator from the throttle shaft during rotation of the mechanical actuator.

- [c13] 13. The air intake assembly of claim 1 wherein the first inlet having the throttle plate positioned therein restricts air from passing through the first inlet when the throttle plate is in a closed position, thereby drawing combustion gas through the second inlet.
- [c14] 14. The air intake assembly of claim 13 attached to an engine having a throttle linkage to rotate the throttle plate and constructed such that the throttle plate remains in the closed position for a range of engine speeds and intake combustion air is drawn from the second inlet, the second inlet forming a low speed air bypass.
- [c15] 15. The air intake assembly of claim 1 wherein the throttle plate has a solid surface and substantially prevents passage of air through the first inlet when the throttle plate is in a closed position and the second inlet has an unobstructed communication to an intake silencer.
- [c16] 16. The air intake assembly of claim 1 further comprising a throttle linkage assembly connected to the throttle plate, the throttle linkage assembly having no means of

link adjustment.

- [c17] 17. The air intake assembly of claim 1 wherein the outlet is configured to be in fluid communication with a crankcase of a two-stroke engine.
- [c18] 18. A throttle body assembly comprising;
a housing having a chamber formed therein, the chamber configured to be in fluid communication with an internal combustion engine;
a throttle passage in the housing and in communication with the chamber;
a throttle plate positioned in the throttle passage and configured to interrupt communication through the throttle passage; and
a bypass passage formed in the housing and having an inlet facing towards the internal combustion engine and an outlet located in the chamber, the bypass passage communicating atmosphere to the chamber.
- [c19] 19. The throttle body of claim 18 wherein the bypass passage extends from a surface of the housing generally toward the internal combustion engine.
- [c20] 20. The throttle body of claim 18 further comprising a low speed bypass tube having a restricted air flow path therethrough, the low speed bypass tube positioned in

the bypass passage located generally opposite the throttle passage in the housing.

- [c21] 21. The throttle body of claim 20 wherein the bypass passage has a venturi formed within the bypass passage.
- [c22] 22. The throttle body of claim 20 wherein the low speed bypass tube has a first portion and a second portion wherein an outer diameter of the second portion is larger than an outer diameter of the first portion.
- [c23] 23. The throttle body of claim 22 wherein the first portion has an annular groove formed therein.
- [c24] 24. The throttle body of claim 22 further comprising a shoulder formed where the first portion intersects the second portion of the low speed bypass tube.
- [c25] 25. The throttle body of claim 22 wherein a section of the first portion is constructed to press fit in the bypass passage.
- [c26] 26. The throttle body of claim 18 wherein the throttle plate is constructed to prevent combustion gas flow through the throttle plate.
- [c27] 27. The throttle body of claim 18 further comprising an actuator, the actuator connected to the throttle plate with a deadband therebetween, the deadband allowing

the actuator to partially rotate without affecting a position of the throttle plate.

[c28] 28. The throttle body of claim 27 wherein the actuator is connected to a throttle linkage assembly having a plurality of nonadjustable links, all of which form a nonadjustable linkage.

[c29] 29. The throttle body of claim 18 wherein a perimeter of the bypass passage is within a perimeter of the throttle passage and the bypass is connected to a noise muffling apparatus.

[c30] 30. An internal combustion engine comprising:
an engine having at least one cylinder formed therein;
a throttle body attached to the engine;
a first passage having a valve therein and configured to have a variable cross-section; and
a second passage vented to atmosphere and having a fixed cross-section.

[c31] 31. The internal combustion engine of claim 30 wherein the second passage includes a tube and the fixed cross-section varies along a length of the tube.

[c32] 32. The internal combustion engine of claim 31 wherein the tube has a first section with an outer diameter that is less than a diameter of the second passage, a second

section having an outer diameter that substantially matches the diameter of the second passage, and a third section having an outer diameter that is larger than the diameter of the second passage.

- [c33] 33. The internal combustion engine of claim 32 further comprising an annular groove formed in the second section.
- [c34] 34. The internal combustion engine of claim 32 wherein the first section passes into an inner chamber of the throttle body.
- [c35] 35. The internal combustion engine of claim 30 wherein the valve is a throttle plate rotatably positioned in the first passage.
- [c36] 36. The internal combustion engine of claim 35 wherein the throttle plate prevents a flow of combustion gas through the first passage for a predetermined displacement of a throttle actuator.
- [c37] 37. The internal combustion engine of claim 35 wherein the throttle plate prevents engine noise from exiting the engine along the first passage for a predetermined range of engine operation.
- [c38] 38. The internal combustion engine of claim 30 wherein

the second passage provides adequate combustion gas to the engine for a predetermined range of engine speed.

[c39] 39. The internal combustion engine of claim 30 further comprising a throttle linkage attached to the throttle body and connected to the valve, the throttle linkage including a plurality of links, each link having a permanently fixed range of rotation.

[c40] 40. A method of manufacturing an engine comprising the steps of:
forming an air inlet opening in one side of a throttle body;
positioning a solid surface throttle plate in the air inlet opening; and
forming a bypass to atmosphere in another side of the throttle body.

[c41] 41. The method of claim 40 further comprising the step of attaching the throttle body to an engine with the bypass to atmosphere generally facing the engine.

[c42] 42. The method of claim 40 further comprising the step of operating the engine from an idle speed to a transition speed with the solid throttle plate in a closed position.

- [c43] 43. The method of claim 42 further comprising the step of increasing an amount of fuel provided to the engine without adjusting the position of the throttle plate.
- [c44] 44. The method of claim 40 wherein the step of forming a bypass further comprises forming a venturi in the bypass.
- [c45] 45. The method of claim 40 wherein the step of forming a bypass to atmosphere in another side of the throttle body further comprises pressing a tube into the bypass up to a shoulder of the bypass tube.
- [c46] 46. The method of claim 45 further comprising forming a venturi inside the tube.